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SOME POINTS TO EMPHASIZE IN TEACHING THE GEOGRAPHY OF AFRICA

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THE study of Africa presents a unique opportunity to the teacher. The second largest continent of the world, known until twenty-five years ago as the "Dark Continent," has, during the last quarter of a century, been parcelled out among the powers of Europe. The same economic necessity which drove England, Holland, Spain, Portugal, and France in the sixteenth and seventeenth centuries to colonize the western world is forcing Great Britain, France, Germany, Italy, and Belgium to extend their influence overseas, until out of the eleven million square miles of Africa there is hardly a mile left which could be appropriated by any nation outside the charmed circle of the those already in possession. Here then is an opportunity to study political geography as it is being made in response to social and economic forces long at work, but only now focussed upon a stage which, for many centuries, has lain for the most part outside the ken of man.

To account for its past isolation.

To explain the why and the how of its recent partition and entry into world affairs.

To learn through this quest the characteristics of the chief colonies and "spheres of influence" are, I believe, the most important points to emphasize in the study of Africa. The recent move of Italy into Tripoli will suggest to many teachers a point of attack for this study.

THE ISOLATION OF AFRICA

The Sahara divides Africa into two parts. North of the desert lies the Mediterranean littoral, occupied by the white race, and practically a Mediterranean country. The real Africa lies south of the Sahara; here are the sweeping savannas, the dense jungles and forests, the fever haunted coasts, the Great Lakes, the Bush, and the Great Karroo; and here live the real African peoples. This portion of the continent has been virtually isolated from the great trade movements of the world. Though Egypt was

the home of civilized races from the earliest ages of antiquity, its culture did not spread over the rest of the continent, shut off as it is on the landward side by a vast desert. Northern Africa has been occupied successively by Phoenicians, Greeks and Romans, but the civilization of these countries did not spread southwards because of the grim barrier of the Sahara. When the Arabs overran the country, they took advantage of the camel, which had been brought into Africa from Asia, and crossed the desert to the Niger, but they were blocked from further advance by the barrier of the dense forests. After ocean navigation became possible, the navigators of Western Europe felt their way along the western coast of Africa, touched Guinea, found gold, ivory, gums and spices, but did not go inland. On the da Gama route to India, Portuguese, Dutch and English ships used to put in for repairs at Table Bay, but for a long period they made no effort to push into the interior. Even in 1876, when the United States was celebrating the hundredth anniversary of her independence, it was thought unusual for a trader to go up the Congo as far as the Yellala Falls, ninety-five miles inland, and, though a few explorers and missionaries had followed along the great rivers, of the vast interior of Africa south of the Atlas Mountains little was known. Why has so large a part of this continent remained for centuries a *terra incognita?* There are four main causes for this isolation:

1. Lack of means of communication with the interior
2. The unhealthiness of the coast lands
3. The small productive activity of the natives
4. The effects of the slave trade in discouraging legitimate commerce.

Though more than three times the size of Europe, the coast line of Africa measures only 16,100 miles as against 19,800 miles for Europe. Not an indentation to compare with the arms of the sea penetrating Western Europe! Not a gulf or bay worthy of the name on the whole coast! This monotonous coast-line not only hinders the trader from reaching the interior, it keeps out the tempering effects of the ocean, giving rise to vast inland spaces of monotonous climate and vegetation which have had a deterrent effect on the development of the continent. Travel between coast and interior is hindered by a plateau, fringed by a narrow coast zone of low land. It suffers from a monotony of surface as well as a monotony of coast-line and climate. There is no great amount of very high land, nor are there any great stretches of very low land; it is a continent of moderately elevated tablelands. Except for the Atlas Mountains, which are shut off from the main mass of the continent by the Sahara, there are no great mountain ranges as in Euro-Asia and the Americas. This tableland presents a high rim to the ocean except in the northeast. From the coastal lowlands the plateau rises in terrace-like steps to an average height of

3500 feet. In most places the bordering rim is so near the coast that the rivers are obstructed by falls and rapids a short distance from their mouths, but by virtue of the railroads already built around the cataracts and rapids of the Nile, Congo, and Zambesi, and the placing of steamboats on rivers and lakes, this has almost disappeared. Stanley was eight months in reaching Victoria Nyanza from the Indian Ocean, but a governor of German East Africa recently left his capital at Dar es Salaam, traveled by steamer to Mombasa, from there by the Uganda Railroad to Victoria Nyanza, thence by steamer around its entire coast, and was back in his capital about a month after he left it.*

The coast of Siera Leone has long been known as "The White Man's Grave," and there are other stretches of these lowlands where the African fever is the dread of the European, but our great advance in knowledge of sanitation, and the destruction of the malarial mosquito, are enabling Europeans to live in regions once considered deadly. Where this zone is narrowest the highlands within easy reach with their lower temperatures and more bracing air play the part of sanitariums.

With regard to the fourth drawback to the development of Africa, the practical abolition of the slave trade has opened wider fields of commerce and industry, spurred the natives to something akin to activity, and established friendly relations between trader and producer.

The labor question is the most difficult of solution; but patience, example and education are already beginning to alter past conditions. Nearly all of tropical Africa is the black man's country, and the European colonizer must depend on him for manual labor. It is difficult to make some of the natives work, for a little labor secures all they need. But the Congo natives have been building the railroads around the rapids of the upper river, they have graded the road bed, burned the lime, and made the brick. They are locomotive engineers and firemen, they have become good carpenters and masons, and native tailoresses make garments on sewing machines for the thousands of black police, soldiers and workmen.*

THE PARTITION OF AFRICA

An examination of the political map of Africa shows it to be divided chiefly among the following nations—Great Britain, France, Germany, Belgium, Italy, Portugal and Spain. Northern Africa, including lower Egypt and the Barbary States, forming virtually part of the Euro-Asiatic continent, has been occupied by Phoenician, Greek, Rofian, Arab and Turk. Each has written his name on the map only to have it effaced by the next comer. France has just substituted the tri-color for the crescent in Algeria, Tunis, and, shall we say, Morocco? And the latest move of Italy in Tripoli threatens to wipe the Turkish color off the map of Africa.

*Foundations of Economic Progress in Tropical Africa, by Cyrus C. Adams.

The partition of Tropical Africa began in 1879 with the explorations of Stanley in the Congo plateau. Since then each of five densely populated countries of Europe—France, Belgium, Great Britain, Germany and Italy—has painted her color over the black man's dominion with little more consideration for him than was shown to the red man in America three centuries ago. Why have these prosperous countries sought new lands in Africa? History repeats itself in the answer. Each wanted colonies

(1) to supply foodstuffs and raw materials for home industries.

(2) for markets in which to sell home manufacturers.

(3) for new homes for the population of the already over-crowded mother country.

That the hopes of these countries for increased trade with their colonies is being realized is evidenced by some of the latest consular returns. The total export and import trade of Germany with German East Africa was $10,000,000 in 1908; the total trade of French West Africa doubled in the ten years ending in 1908; the imports of the six British West African colonies were valued in 1908 at $37,000,000, and exports at $35,000,000 (approximated). Europe is looking to Africa for a new source of supply of maize; London markets are supplied with apples, pears and plums from South Africa; and there is no doubt that much of the world's future supply of cotton will come from British East Africa, German East Africa, the German Cameroons and Nigeria.

POLITICAL DIVISION

Italian Colonies.—Italy in Tripoli means that the Italians are coming into their own again, for in Roman days Tripoli was a profitable colony. It has an area as large as Illinois, Kansas, and Texas, with a population of about a million, composed chiefly of Berbers, Arabs, Turks and many Italians. Tripoli has no rivers worthy the name, and suffers from a long, hot, dry summer. Corn, barley, cattle and sheep are its chief products; while gold dust, ivory and feathers reach the Mediterranean through the three great caravan routes converging upon the Tripolitan coast. When the harbors are improved, the caravans policed, and the water now hidden in the sands poured upon the thirsty land, Italy may reap some profit from the acquisition of this new colony, and thereby reimburse herself for the disasters she suffred in connection with her colonies on the Red Sea and in Somaliland.

French Colonies.—Since 1870 France has been quietly at work building an empire in Africa, till now she has acquired the lion's share of the continent. The territory which France controls is one and one-half times that of the United States, and stretches from the banks of the Congo to the Mediterranean, and from the Atlantic Ocean to the valley of the Nile, except a few patches of British and Spanish territory on the west coast,

and the British and German colonies on the coast of Guinea. In East Africa France has Madagascar and French Somaliland.

In extending civilization over West Africa, France has built 6,000 miles of railroad, 25,000 miles of telegraph, and 10,000 miles of telephone. You can buy in Paris a round trip ticket to Timbuctoo, and reach all parts of the world from there by telegraph.

A railroad is being pushed across the Sahara to Timbuctoo and Lake Tchad, the former to connect with the line from Dakar on the Atlantic coast. Camel police guard the caravans, which are often moving cities. Darkar, the capital of Senegal, is the seat of the government of French West Africa and the chief seaport. It is a city of some 25,000 population, and looks like a French town, with its shaded boulevards and magnificent public buildings. In all this territory the French govern 12,000,000 of the more enlightened natives of Arica. The chief products of the West Coast and French Guinea are palm kernels (for oil), rubber, gum, gold, ivory, mahogany, and ground nuts. The Sahara, like our great American Desert of thirty years ago, has a supply of underground water, and what we have done through irrigation in Arizona and New Mexico, may be repeated there. Its surface is elevated, rising into a high plateau with peaks of 8,000 feet altitude. It is dotted with fertile oases. The French are working patiently at the water problem, planting schools and hospitals, and introducing the American phonograph and sewing-mchine along with the railroads. Algeria is her most profitable colony; it is now well governed, and the city of Algiers has become a winter resort for Europeans.

British Colonies.—The territory under British control stretches with but a single break (German East Africa) from the mouths of the Nile to Cape of Good Hope. In 1795 England captured the Cape to use as a halfway house to India. The Dutch had settled there, but neither nation then knew of the gold in the rocks of the Transvaal, or of the diamonds at Kimberley. Then Egypt came under the British "sphere of influence," and when the Suez Canal was built, her fate was sealed. Now England is working to cement her vast colonial empire in Africa by building a railroad from the Cape to Cairo. From Alexandria it runs past the Pyramids, past the great dam at Assouan to Khartoum, and on to Sennar on the Blue Nile. The southern end starts from the Victoria Station in Cape Town, climbs up the Great Karroo, skirts the Kalahari Desert to Kimberley, reaches Bulawayo in Matabeleland, crosses the Zambesi at Victoria Falls, (over twice the height of Niagara) on into Northern Rhodesia to Broken Hill, the present terminus of the line, and about 2,000 miles from Cape Town. The whole line will be 6,870 miles long; about three-fourths of it is completed. When the northern end reaches Victoria Nyanza, and the southern end Lake Tanganyika, there may come a halt, for between the two lies German East Africa. Will Germany grant England right of way?

Germany may ask for Walfish Bay in return, as it is the only good harbor in Southwest Africa and is an aggravating patch of British territory in the midst of German possessions.

Egypt consists of the Nile and the desert. It would be all Sahara if it were not for the Nile. It is one of the important trade routes of the world, and, though nominally under Turkish rule, British influence predominates. The Nile is navigable throughout its course in Egypt, and is used for the transit of heavy goods. Only the land watered by the river can be cultivated, but modern engineering skill is bringing larger areas under irrigation. The largest dam in the world has been built at Assouan, forming a storage lake in the Nile 200 miles long.

Egypt is the third cotton-producing country of the world. All her other exports are of minor importance compared with cotton. Great Britain is her largest customer; she spins the cotton fibre and sends back to Egypt cotton cloth, the largest import of the country. Egypt has sugar-mills and flour-mills, makes cigarettes and beautiful water-jars. Many of the cities are built on the ruins of ancient towns, for Egypt was old when London was a cluster of mud huts. Its mild winters and dry climate, its famous monuments and ruins attract many tourists. About 40,000 pilgrims on their way to Mecca pass every year through the Suez Canal; of the 4,000 ships which paid their toll in 1905, one-half carried the English flag.

South Africa. The discovery of gold near Johannesburg, and of diamonds at Kimberly, brought a rush of immigrants into the country, as into our West in 1849; Johannesburg is now an important railroad center for lines radiating to Cape Town, Durban, and Lourenco Marques. But the settlers are finding that the true gold is in the soil and in the cultivation of the soil. Up from the coast lies the *veld*—the Great Plains of South Africa. The Great Karroo is a vast arid stretch with no grass and no trees, but with succulent shrubs and brushes. The soil is rich, the air clear and bracing, with warm days and cold nights. Karroo farmers love their landscape and lonely life. A few days' rain makes the dry Bush land like a garden, covered with flowers. On the veld grow the grasses which support cattle, sheep and goats. Next to the wool crop the chief product is ostrich plumes. Farms are great ranches, population scanty as in the plains of Argentina and in Montana and North Dakota. Many of the rivers are intermittent like the Platte in Kansas; roaring floods when it rains, but in the dry season chocked with sand. On the plateau the climate is well suited to Europeans. Here the Boer farmers trekked after the English captured Cape Colony, and they still form a large part of the population. Natal is the "Garden of South Africa." Apples, plums, and other fruits find a market in London and in the United States; ripening, as they do, in our winter they bring a good price. From the coasts railroads climb

up steep grades into the interior, to the mining regions in the Transvaal; and at Cape Town, Port Elizabeth and Durban the originally poor harbors have been improved.

British East Africa and *German East Africa* have many features in common. The plains rise gradually from the coast. Here are white settlers, raising cattle, sheep and horses, like our farmers in western Nebraska and Texas. On these grasslands roam the big game, as did the buffalo of our western country. Experiments are being tried in the raising of cotton, alfalfa, fruits, and vegetables. From Mombasa the English have built a railroad to Victoria Nyanza, and the Germans are pushing a line from Dar es Salaam to Lake Tanganyika; the latter will strike the lake at Ujiji where Stanley found Livingstone.

German Colonies.—Besides German East Africa, Germany owns the Cameroons and Togoland on the Gulf of Guinea and German Southwest Africa. The same zones of surface, climate and vegetation are here, as elsewhere in Africa. In Togoland and the Cameroons, as in German and British East Africa, much money is being spent on cotton cultivation. These regions are possible rivals of the United States in the cotton trade. Germany would like to supply her mills from her own colonies. From Southwest Africa the Germans are building a railroad which will eventually connect with the line from Dar es Salaam, bringing the two separated parts of Germany's colonial empire together.

The Belgian Congo.—The Congo River is the outlet of this state in the heart of Central Africa. Stanley Pool, at the head of the rapids, is a center for the collection of rubber, ivory and copal gum from the interior, and many warehouses of foreign nations are built along the banks of the river above this point. Railroads run around the falls and rapids, and in the upper river there are nearly one thousand miles of continuous navigation; so the river is a great commercial highway and many steamboats carry products to the centers of distribution. The forests of the upper Congo rank with those of the Amazon; they are dark and almost impenetrable—veritable jungles threaded by footpaths. The river is second in volume to the Amazon. Both rivers are visited by a vertical sun twice a year, hence both are regions of heavy rainfall. Owing to the elevation of the interior of the Belgian Congo, it offers greater inducement to the European settler and trader than does the Amazon valley. The slave trade has been abolished, but the supply of ivory is diminishing. We have had to invent a substitute for it.

CLIMATE AND ITS EFFECTS

Africa is a country of small rainfall, except in equatorial regions. There the vertical sun occurs twice every year and the consequent heavy rainfall gives rise to the Niger, Congo, Nile and Zambesi rivers, and to the

dense, jungle-like forests. Where rains occur but once a year the forests are less dense. The climate and vegetation north of the equatorial belt repeats itself south; the grasslands succeed the forests north and south, then come the desert belts, though the Sahara is drier than the Kalahari on account of the great land mass north and east. The climate and vegetation north of the Atlas is Mediterranean in character; that of South Africa is similar to Australia in the same latitude. On the southeast of each continent there is abundant rainfall, lessening towards the interior; the tropical and semi-tropical vegetation of the coast gives place to the arid growth of a temperate climate. North and south of the Atlas Mountains there is a similiar change in rainfall and vegetation.

SUGGESTED MODIFICATIONS IN HIGH SCHOOL GEOGRAPHY

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IN many places, physical geography is being placed on the defensive. It is claimed that the study is unduly technical and not sufficiently practical. If it has not been found that it contributes as much in the way of training and practical information as a study ought to contribute, then surely physical geography ought to be modified or give place to some other study. Most friends of physical geography agree that the study must be somewhat modified if it meets the reasonable demands which are now imposed upon any study in the high school. For the high school courses are more than crowded. Our complex life seems to demand such a variety of studies that any branch which cannot clearly justify its place in the curriculum must give way.

During the last few years the demands made by the friends of vocational training have been very insistent. One group of people is urging that agriculture be taught in the high schools, another, domestic science, a third, manual training, and so on. All of these studies are capable of vigorous defense. All of them promise definite and practical training, and their claims cannot be dismissed.

Physical geography is about the only study in the first year of the high school that can be readily displaced. English must be retained. Most people believe that algebra must be retained. Many would not consent to have history taken out of the course. Latin, if studied, should begin in the first year of the high school. Thus it comes about that in the pressure which is being brought to bear, physical geography is the study which is most likely to yield, and unless we can show clearly that it is capable of giving the pupil more valuable information or more effective train-

*Abridged from an address given before the Earth Science Section of Central Association of Science and Mathematics Teachers, Chicago, Dec. 2, 1911.

ing than any of the studies which are seeking to displace it, then physical geography is likely to be displaced.

One who has read the arguments presented by the N. E. A. committee, or by the committee of the Association of American Geographers which, two or three years ago, reported upon high school geography, notes that there is general agreement on the part of the members of these two committees that geography needs humanizing.

Physical geography is, after all, a relatively young science. Since college men have largely governed the contents of high school text books in physical geography, there has been a tendency to introduce much that really belongs in the college course. At the present time, almost every textbook which was written for high school use, is used in colleges. At the University of Wisconsin we are carrying on three courses in physical geography and in each one of these courses the textbook used was written by a college man for high schools. Manifestly, there is need of a closer discrimination between the facts of elementary physical geography and the facts of advanced physical geography, and it ought not be difficult to agree upon the major portion of the facts which should be left for college study, if they are to be studied at all.

School men who have expressed themselves upon the subject are generally agreed that many facts which deal solely with physical phases of geography may, to advantage, be omitted in order that room may be made for topics that belong to what may be termed applied geography. They are a part of commercial or industrial or political geography, or of some other phase of geography which deals with man's activities and interests. At the present time, every one engaged in teaching pupils who come from the high schools realizes how woefully lacking pupils are in a knowledge of the elementary facts of locational geography. It is a common thing to find in college freshman classes that half of the students cannot tell even in what country great rivers like the Volga or Ganges or Rhine or Orinoco are found. Examinations which we have given have shown that a majority of the students cannot pass an examination in those phases of geography which are taught in the grammar schools, and which are supposedly the possession of all educated people. It is not uncommon to find college students who do not know that France is a republic; who know next to nothing about the leading industries of a great country like Germany or France; who cannot locate such cities as Buenos Aires or Calcutta or Moscow or Madrid or Edinburgh; who regard Portugal as a city; who cannot tell the difference between latitude and longitude; who have not, apparently, any clear conception of the causes which bring about our change of seasons. I have made it a practice in recent years to give to our classes in college geography tests in these elementary phases of the study, trying always to ask perfectly reasonable questions, and we find that the students make a sad showing.

I do not speak of this in criticism of the teaching which is done in the grammar school. From a considerable number of years of close contact with grammar school work I am persuaded that the geography teaching in the grammar schools is just as well done as it is in the high schools or the University, and possibly better. In my judgment the fault lies in our practice of assuming that because these phases of geography were taught in the grammar school they were understood and will be remembered, while experience shows over and over again that they are not well understood and are not remembered.

Now, if years of observation in many normal schools and colleges shows that those phases of geography which people most need are not understood by high school or college students, then it seems sensible that we should recognize the facts as they are, and proceed accordingly, and not close our eyes and say "I know the students don't understand and don't know these facts, but they ought to, therefore it is not my business to teach them." It is difficult to see how we can justify ourselves in any such course. The fact is, that some universities are now giving courses whose content is simply a maturer study of the facts usually taught in the grammar school, but frequently not understood when taught, and because not understood, are not retained. Unless those facts are elaborated and impressed in later years, the pupil goes out from his school life with an exceedingly meagre fund of geographical knowledge.

In deciding, therefore, what ought to be the content of high school geography, we must be governed by two considerations: first, the educational needs of the pupil, and secondly, the practical needs of the pupil. By educational need, I mean the need of intellectual training, sometimes called mental discipline. By practical need I refer to the need, which every educated person has, of a fund of knowledge about the countries and peoples of the world and which it is the province of school geography to provide. No one who knows how physical geography is commonly taught will claim for a moment that this study *as it is taught* possesses any unusual disciplinary value. If taught as we all think it ought to be taught, it would possess disciplinary value, but 15 years of effort to have it so taught have not resulted in any satisfactory outcome. And while some of us have been trying to teach physical geography for its disciplinary value, we have been neglecting those phases of the subject which are more useful. It is apparently clear that the efforts to make physical geography in secondary schools a highly disciplinary study are a failure. The course left open for us is therefore to recognize high school geography as a study capable of giving the pupil a knowledge of many things about the world in which he lives, things which every educated person is expected to know, and wishes to know: knowledge about the great nations which are directing the vast affairs of the world, Germany, England, Japan, France, United States.

Every person would be glad to have a fuller knowledge of the resources and possibilities of Argentina, Brazil, China, South Africa, and Canada. These countries are not at the present time in the front rank, but they are rising. They are taking an increasing part in the world's active doings. We have got to reckon with them in the future. This is an age of commerce and of industry. The foremost aim of the leading nations of the world, aside from maintaining their own political integrity, is to expand their trade with foreign nations. The great competition between Germany, Great Britain and ourselves is trade competition. If jealousies and suspicions exist, they usually are associated with commercial interests. Nations are extending their territory in order that they may extend their commerce and give fuller employment to their own people at home, in manufacturing the goods which they sell abroad. In other words, with a constantly increasing population at home, decreasing ability to supply their own needs, increasing need of importing from without, these countries are being forced to a more and more careful consideration of the great economic problems which are confronting them.

The contest between Russia and Japan, the aggressions of Russia in Asia, the ambitions of Germany, our own ambitions, are all closely related to commerce and to other economic considerations. Large numbers of trained men are needed for our consular service, large numbers for other forms of Government service, and large numbers are needed in business. High school geography can not delve deeply into economic or commercial problems. It can, however, do something toward introducing young people to these problems and toward giving them a basis of intelligence for thinking about them in the future.

If this is true, and it seems to me that it is true, geography in the high school must be given a somewhat different trend from that which in the majority of cases it has been receiving. There is no reason why physical geography of both the elementary and advanced types should not be taught. There is no reason why those who desire to have a detailed knowledge of land forms and of physiographic processes should not have an opportunity to receive instruction in those subjects. Perhaps physical geography ought to be offered as an elective in the senior year of the high school, as it was recommended that it should be by the Committee of Ten in 1893. Unquestionably, courses in pure physical geography ought to be given in the colleges. But responsibility does not end there.

The educational ideals of our age, whether rightly or wrongly, have undergone a change, and everywhere intelligent men and women are demanding that education shall make for efficiency; that scholarship is not the sole purpose of education, and that scholarship and efficiency are not synonomous. Everywhere, thoughtful people are saying that our school ininstruction must more directly equip young men and women for taking a

place in the world's affairs, and that the eight to twelve years of instruction which they have received in the schools shall go farther than it has gone in fitting these young people to do efficient service in the world; that their education shall not be such that it must all be begun anew when the pupil enters some actve calling in life, but that he shall find that a considerable proportion of what he has learned in the schools is useful to him in later life.

Many people do not believe in this doctrine. Unquestionably the unlimited acceptance of this doctrine will lead us astray. Undoubtedly the present tendency of education is too strongly toward the utilitarian. But the way to meet the present situation is not to insist rigidly upon old lines of study and not to oppose unqualifiedly the new ideals in education, but to seek to preserve, as far as we can, those phases of the older education which time has proved to be valuable and to unite them with those phases of the newer education which practical people are insisting upon. The pendulum is bound to swing too far. Our schools are undoubtedly moving too rapidly toward the vocational and utilitarian side. Perhaps we shall be swept from safe moorings, but the way to prevent it is not to oppose all change. It cannot be said that commercial geography as it is generally presented is thoroughly satisfactory. It is a little too much like Homer's catalogue of the ships. Doubtless too many unconnected details about production and trade are introduced. Doubtless, considerable that is useless either for practical purposes or for disciplinary purposes is introduced. But granting all this, it seems that what the high school course in geography needs is a well-balanced, well-worked out study of the elementary phases of economic geography; not necessarily commercial geography alone. Writers of textbooks and publishers hesitate to call a textbook an *Economic Geography*. We shall soon cease to fear that word. *Commercial Geography* is more popular, but it makes little difference what we call the study. The fact is, students need to know more about the geography of industry, of agriculture, and of trade, than the ordinary courses in high school geography now give. People need to know more about the resources of their own country and of foreign countries than they now know.

Furthermore, it seems that the course in economic geography should be considerably shaped in accordance with the probable future needs of the pupils. In rural high schools, where it is likely that a majority of the pupils will live on farms or among farms, agricultural geography ought to receive a considerable emphasis but the same course ought not to be given pupils in large cities, most of whom will never be agriculturists. The pupils in city schools will profit more from a study of commercial and industrial geography. The first part of high school geography, we are agreed, should include the fundamentals of physical geography. The second part it would seem should be in one case closely related to the subjects of agriculture and agricultural economics, and in the other closely related to the economics

of trade and production, and that in both courses locational geography, through the study of maps, should be emphasized, and that in both, laboratory and field work should be encouraged, though it does not seem hopeful that any great amount of field work will be accomplished in city schools.

In conclusion, then, my plea is for a half year of physical geography from which the more technical and specialized details are eliminated and into which more of the human relationships are introduced: a second half year of geography, based largely upon the class of pupils who are taught, with a strong economic flavor in either case; with a systematic study of maps and distribution; with a considerable reading of supplementary articles which keep the pupils in touch with the current affairs of the world; and with a constant effort to fit pupils to appreciate some of the actual problems which will face them when they go out into their life work. I do not believe that such a course will be any less disciplinary than physical geography. I do believe that it will be more valuable, and that, by such a modification of the course in geography, we shall be able to retain in the high school curriculum a study which people recognize as highly desirable but which in its purely physical phase can never prove fully satisfactory in an age so strongly dominated by economic ideals as is the present.

ECONOMIC NOTES

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THE fourth series on Foreign Labor Statistics published by the British Board of Trade gives the percent of the total persons engaged in gainful occupations who are found in certain leading industries in seven countries These figures are significant since in them many different causes find expression—difference in natural resourses, in location, in character and density of population, and in stage of economic development.

OCCUPATION GROUP	France	Germany	Austria	Hungary	Italy	Belgium	United States	United Kingdom
Agriculture	41.42	35.11	60.80	70.15	59.06	21.90	35.64	12.00
Commercial Occup.	6.54	6.30	3.34	2.56	3.43	11.79	9.91	11.39
Conveyance of men, goods and messages	2.89	2.89	1.70	1.55	3.12	2.03	5.95	8.20
Mines and quarries	1.59	3.25	1.56	.78	.89	6.46	2.09	5.00
Metals, Machines, implements and conveyances	4.35	6.99	2.78	2.15	2.14	5.95	3.72	7.89
Building and works of construction	4.20	6.99	2.96	1.48	5.02	7.28	4.43	6.77
Textile fabrics	4.55	3.75	3.26	.37	4.81	6.86	2.02	6.92
Dress	8.05	5.39	3.92	2.85	6.64	7.86	4.29	7.23

For some years it has been theoretically possible to smelt iron ore by electricity, but the process has found little application. Recently, however, experiments have been undertaken on a large scale at Trollhatten, un-

der direction of the Swedish Government. Sweden lacks coal and its forest resources are rapidly dwindling, hence the salvation of its iron industry apparently depends on making use of water power. In these experiments, commercial conditions have been established so far as possible and a rigid cost accounting system installed. The results have not been officially published, but it is understood by the Swedish iron trade that expectations have been more than realized.

Should electric pig iron prove materially cheaper than coke iron, a profound industrial revolution would be inaugurated. Originally iron furnaces were located near forests which furnished charcoal; about 1840 in this country they sought the vicinity of the anthracite fields; later, they moved toward the fields of coking coal; and if electric smelting should prevail, the iron industry would inevitably migrate toward the iron ore beds and the water falls. In that case, countries like Sweden would come into their own, and the northern shore of Lake Superior might easily become the center of the iron industry of the United States.

The production of artificial silk has increased by leaps and bounds during recent years, rising from 1,400,000 kilos in 1904 to 5,500,000 kilos in 1909. Since the later date, five new plants have begun operation in Germany, two each in Russia and Japan, and several in other parts of Europe. As a result of the tariff imposed on artificial silk by the Payne-Aldrich Act, several factories have been established in the United States, one near Philadelphia having a daily capacity of 2240 lbs.

The artificial silk industry does not demand a climate suited to the silk worm, nor much hand labor, consequently it can be established in cold temperate countries having a high standard of living and of wages.

While artificial silk is thus rapidly gaining, artificial camphor, contrary to all expectations, is being undersold by natural camphor. This situation is due to the Japanese government monopoly, which has decided that the one way to get rid of its formidable rival is to reduce prices so low that the artificial camphor factories will be driven out of business. Owing to its monopoly character, the Japanese management has been able to make such a reduction in price without actual loss. It is however, using up the forests of mature trees without providing for any adequate replanting. The policy must thus, of necessity, be a temporary one, but it may well be continued long enough to put the artificial camphor concerns out of business.

A few years ago the whaling fleets had almost disappeared from the ocean. Recently there has been a marked revival of the industry, due in part to the increase of whales, in part to the increased demand for certain of the products, but chiefly to the use of modern weapons and modern factory methods. The hand harpoon has been replaced with the cannon harpoon, and the vessels carry a full equipment for trying out the oil at sea

and saving every part of the catch. Materials unavailable for other purposes are made into fertilizers. The whales are hunted both in Arctic and Antarctic waters, especially around Kerguelen Island. Norwegian and German vessels are also meeting with much success in southwest African waters.

UNITED STATES

Traffic via the Tehuantepec railway in 1905, before the modernizing of the railway and construction of terminal ports, amounted to about $8,000,000. In 1907, the first year after these improvements, the traffic over this route originating in the United States amounted to $25,000,000; three years later, in 1910, such traffic had risen to $70,000,000. In the meantime traffic over the Panama railway rose from $9,500,000 in 1907 to $12,750,000 in 1910. It is of course true that the Panama railway is congested by canal work but the extraordinary increase in traffic over the Tehuantepec route is none the less significant. The bulk of this traffic originates on the eastern or western coast of the United States, or in Hawaii. The largest single item of east bound freight is Hawaiian sugar.

Recently the barge *Edward C. Green* arrived at St. Louis with a 1500 ton cargo which had come across the Tehuantepec route, thence by steamer to New Orleans, where it was transferred to the barge. It is planned to build a fleet of sea-going barges to ply between St. Louis and the gulf port of the Tehuantepec route, by which a large saving in freight may be made. The cargo of the *Edward C. Green* consisted of California barley on which the saving in freight amounted to $3.50 per ton compared to rates by rail.

Since the completion of the Western Pacific Railway by Gould interests, the Hill system has established through service from Chicago to San Francisco via the Burlington, Denver and Rio Grande and the Western Pacific. This traffic alliance with the Gould roads was evidently established several years ago, when the projected Burlington extension from Denver to Salt Lake City was given up. So far as the new Western Pacific is concerned, it offers far easier grades than the Union Pacific; but the high summit and the steep grades on the Rio Grande would seem to render this a sight-seeing rather than a standard business route.

The fiscal year 1910 was the first under the conditions of virtual free trade between the United States and the Philippines created by the Tariff Act of 1909. Total exports from the islands increased from 35 to 40 millions while the share taken by the United States rose from 14 to 17 millions. On the other hand imports into the islands were practically 50 millions in 1910 against 31 millions in 1909, while the share supplied by the United States was 20 millions in 1910 against 6 millions in 1909. Before the Act was passed it was argued that it should be done because the Philippines were entitled to free trade with the United States, but it appears that the United States has profited even more than the Philippines. The increase of cement exports to the islands is especially notable.

ELEMENTARY WEATHER OBSERVATIONS

By ROBERT M. BROWN,
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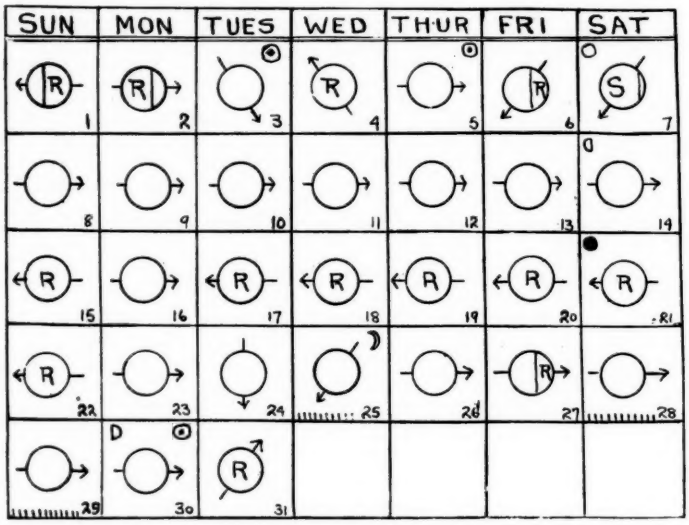
II

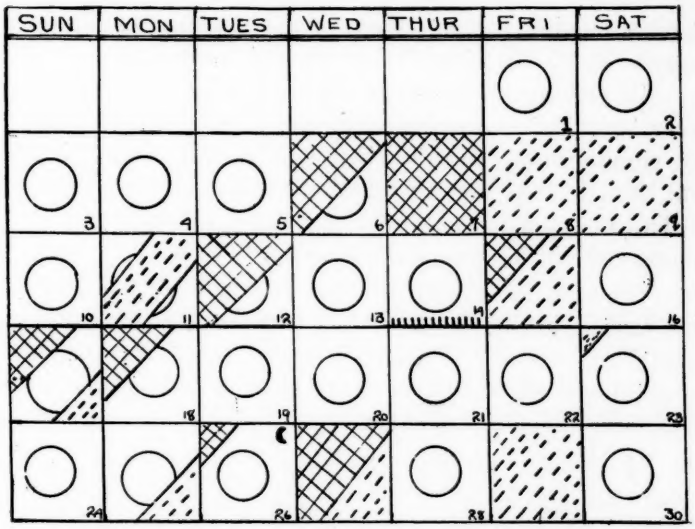
The addition of another month's calendar helps the pupils to approach more closely to the underlying principles of atmospheric changes and furnishes data of inestimable value for the continuation of the studies. As the months go by, there may be added many more features and in the two or three years which may be devoted, in part, to this branch of practical science, a broad basis of the fundamental conceptions may be acquired. As soon as the child has passed the stage of simple observations and the calendar can be used for specific generalizations, the records may be correlated. Beginning, as in the September calendar, with the state of sky and precipitation, in the calendar of succeeding months, wind may



CALENDAR FOR OCTOBER, 1911, WORCESTER, MASS.
Symbols explained in the text.

be added, then temperature and finally the varying conditions of humidity and pressure. Each of these may be expanded as the child becomes capable of grasping more; thus, to the state of sky may be added the kinds of clouds and to the direction of wind, wind velocity. With the ever accumulating amount of evidence which each month presents, the children should be led to form their own conclusions and beyond this as time goes on they should make some attempt to consider in their proper relationships combinations of causes and their effects. From this the step to the theory of atmospheric changes which may come much later is not a difficult one.

In the discussion of the October calendar which is reproduced here, two problems are before us, to consider in the light of additional data the generalizations suggested by the September calendar and to make new generalizations which, by the way, must be considered temporary until a large array of data is secured. A new series of observations is added, that of wind direction, and the symbols in use are the ordinary ones of the weather map: arrows fly with the wind; R means rain; S, snow. The phases of the moon are indicated in the upper left hand corner of the squares and are indicated by the ordinary symbols of the almanac; and a somewhat arbitrary symbol is used for the halo around the moon which was seen on the third, the fifth and the thirtieth of the month. Frost is indicated as on the September calendar.



BOARD CALENDAR FOR SEPTEMBER, 1911
Circles, Sunshine. Dotted Areas, rain. Cross-lined Areas, Cloudy. Frost indicated on 14th. Crescent moon on 26th.

Review from the September calendar.

Generalization 1. This month's record is another point against the validity of the saying. The first Sunday was stormy, but the second and the fifth Sundays were clear. The observations should be continued.

Generalization 2. No further evidence.

Generalization 3. The twenty-fifth day was clear but rain fell on the Friday following. Another point against the saying.

Generalization 4. No further evidence.

Generalization 5. No further evidence.

Generalization 6. This saying is indefinite as is the case of many which have little or no foundation in fact. If the drought indicated by

the September rains is to follow immediately, the saying is not upheld for the rainfall during October was far from being slight.

Generalization 7. No further evidence.

Generalization 8. Rain fell on half of the days of the month following the crescent moon of September. This is a point in favor of the saying but we should not be ready to decide the question on one, two or a dozen cases. The crescent moon appears again in about the same position (wet moon?) on October 25.

The new work would be similar in kind to that undertaken with the September calendar but with a generally broader scope which is in part the result of an additional item, the wind, on the calendar.

1. "Much rain in October, much wind in December."

Although the rainfall for the month was not much above the normal for October months, the percentage of rainy days was high. It will be necessary to watch the wind elements during December.

2. "If October brings heavy frosts and winds, then will January and February be mild." Later the incongruity of heavy frosts and winds occurring simultaneously may be discussed, but it is up to this point an untouched theme. Data may be collected upon it however if it seems necessary. Three days of the last week of October record heavy frosts. Watch the temperature of January and February.

3. "There is often about October 18, a spell of fine, dry weather and this has received the name of St. Luke's little summer." The week of the eighteenth was stormy this year; rain fell from the fourteenth to the twenty-third with the exception of the sixteenth which was partially clear. What has been the record of previous Octobers?

4. "A ring around the moon brings rain." On the evening of the third there was a lunar halo, rain fell the next day. Again on the fifth there was a ring around the moon and rain began to fall late on the sixth. A third halo was observed during October on the thirtieth and rain fell on the thirty-first. This offers a good beginning of evidence but more should be accumulated.

5. A student reported that the squirrels were laying up a store of nuts and she had heard that it was a sign of a hard winter. There are a large number of sayings that have their basis in the actions of animals and they form interesting and instructive topics for investigation.

6. "East wind, rain; west wind, clear." The records of the month quite uniformly uphold these two sequences. Later the exceptions are interesting lines of study.

7. Someone remarked during the rainy spell beginning on the fifteenth that the weather would not change until the moon changed. New moon occurred on the twenty-first and the weather cleared on the morning of the twenty-third. It depends largely upon one's state of mind whether

or not the above is taken in corroboration of the saying. It is necessary perhaps to have the question somewhat more definitely defined, if it can be done, but, on the other hand, more data are liable to furnish a decisive answer.

8. Snow fell on the seventh. An evening paper of this city mentioned in its editorial columns this first snow storm of the season and said, among other things, "It is now a safe wager that we are to have an early winter." Why not investigate the condition carefully? If there are on file records of other seasons, including early snow falls, and the following months approaching the winter season how easily the question could be answered. The reason why many remarks about the weather are so persistent is that people do not take the trouble to follow them up. Let the teachers of weather be not remiss in this at least, and no matter how simple, how apparently absured or how profound a saying is, if it is investigated in all earnestness and sincerity, I am sure that the teaching of the elementary problems of the atmosphere will be more efficient.

LOCAL CLIMATIC PECULIARITIES IN THEIR RELATION TO INTENSIVE AGRICULTURE

By ERIC REXFORD MILLER,
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THERE are climatic zones on every farm that need to be studied and taken advantage of just as slight peculiarities in plants and animals are studied and taken advantage of in breeding.

The causes of such climatic peculiarities are not far to seek. The chief factors are:

1. The varying thermal properties of different soils,
2. Air drainage, or the flow of air cooled by contact with cold ground from the higher places to low ground,
3. The varying exposure of the ground to the sun,
4. The influence of neighboring bodies of water, such as lakes and rivers.

We may best understand the power of different soils to produce local temperature differences by following the course of a beam of sunlight. The light and heat of the sun, which are of the same nature, are transmitted across the ninety odd million miles from the sun to the earth in the form of waves. The substance in which these waves are transmitted is called the ether. It has not so far been grasped by any human means, and its nature is known only from the properties of the wave motions that take place in it. The waves of light and heat are either turned back, or absorbed when they break upon opaque substances, but pass through clear or transparent materials.

Clearness or transparency differs even in the same material with re-

gard to different wave lengths of light and heat. Now the atmosphere, which is very transparent to the short waves that affect our eyes as light, is absorbent of the longer waved heat beams, so that about 25 per cent of the energy of the solar rays is absorbed even from an over head sun. The rays absorbed by the air are for the most part invisible, except when the sun is low, when the air also absorbs or reflects the blue light, leaving the rays that come through tinged with red.

In a similar way the rays that strike the soil and its covering are selectively absorbed. The returning rays are the ones that give every object its color. The absorbed rays are partly employed in the life processes of plants, and partly in producing the accelerated motion of the molecules of the soil that we perceive as a rise of temperature. The color of various soils is an indication of their heat absorbing ability. The lighter soils reflect the most, and absorb the least, while the darker ones reflect little, and absorb much.

Coupled with the power to absorb heat is the power to give out heat by radiation. A good absorber is a good radiator, and a poor absorber is a poor radiator. Many examples of these laws will occur to you, the bright tea kettle to retain heat, light clothes in summer to reflect, and black clothes in winter to absorb, etc.

To these laws are due not only local climatic differences but also a much wider range of extremes of temperature in the soil than in the air. Professor Moore quotes in his Descriptive Meteorology, page 67, the hourly mean temperatures of the soil and of the air about 10 feet above it at Tiflis, showing that in the afternoon in midsummer the soil is more than forty degrees warmer than the air, and in midwinter three or more degrees colder, on the average. Professor Cox found in his study of temperature conditions in the cranberry marshes of Wisconsin, published as Bulletin T, U. S. Weather Bureau, that the temperature a few inches above the surface of the ground rose to 100° on September 30, 1906, when the temperature of the air in a shelter some feet higher was 60°. During the following night the temperature in the cranberry bog fell to 19°, while that in the shelter went no lower than 29°.

The temperature changes in the soil are modified very much by the state of the atmosphere above them. Clouds, dust, and fog intercept both incoming and outgoing radiation, so that the range of temperature of the soil is not so great. Clouds and fog act like a blanket, for they reflect back, and radiate back the heat sent from the ground, and thus prevent the low temperatures of night that occur on clear nights, when there is nothing to turn back or replenish the heat given out by the soil.

Soil radiation plays a great part in air drainage, for it is the cooling of the layers of air next the ground by conduction when the ground is colder than the air above it, that causes these low sheets of air to become

dense and to flow down hill and accumulate in low places where they continue cooling. The low temperatures of the cranberry bogs are doubtless produced in this way, for Cox notes that it was the air 5 inches above the ground in the bog that was coldest.

Air drainage is not an unmixed evil, taking the whole phenomenon into consideration, for it draws away the cold air from higher ground and gives more favorable conditions there than the average. In San Paulo, Brazil, the coffee plantations are reported by Hann in his Handbook of Climatology, to be laid out on the hills only, and never in the valley bottoms. The reason for this is that frost occurs in the depressions between the hills, but very rarely on the hills themselves. The famous "thermal belts" of North Carolina are another example of the same thing. These are belts of 400 feet or less vertical thickness, about 100 feet above the valley, that exhibit themselves on the sides of the mountains. Vegetation of all kinds within these zones is untouched by frost, nor has fruit of any kind ever been known within these lines to be frost-killed, though there have been instances where it has been from a severe freeze.

The exposure of a slope to the sunshine is another factor that we scarcely realize the importance of. The intensity of sunlight per unit area is greatest on a surface on which it falls vertically, and diminishes slowly at first, falling to seven-tenths of its full value for a 45° angle between the sunbeam and the slope, and to half at a 30° angle, and then rapidly to nothing at 0° angle. Full advantage of this is taken in Europe, and especially in Germany where the north banks of the valleys are terraced and planted in vineyards. Varieties of the grape are thus grown that could not survive the climate of the level country. The climatic conditions of latitudes many hundred miles farther south are thus secured. We make very little use of this natural resource in this country as yet on account of the high cost of labor, but the sunlit slopes of our river and ravine banks must be kept in mind for they will be needed as the population of the country increases.

A lake is to the climate of its locality what the fly wheel is to an engine. Its inertia smooths out the irregularities and tones down the changes. The source of this ameliorating power is found in the high specific heat of the water. It takes more heat to warm a given quantity of water any stated number of degrees, than to warm the same quantity of any other substance the same number of degrees. Similarly the same quantity of heat will have less effect in heating water than any other substance, the same quantities being considered. It results from this that the shores of a lake experience the extremes of heat and cold in a much less severe form than do places away from the influence of bodies of water. The summers are not so hot, nor are the winters so cold; the hot waves and cold waves are tempered.

Aside from the smoothing out of the oscillations, a lake is a great storehouse of heat. Its clearness allows the sun's rays to penetrate and be absorbed throughout the entire mass. The circulation of the waters carries heat to all parts whether exposed to the sun or shaded from it. The soil on the other hand is heated to a moderate depth only, and gives up at night nearly all that it received during the day, and its specific heat is so small that a small quantity of heat is all that it can hold at moderate temperatures.

A lake shore climate is therefore not only more equable, but is actually warmer than the climate of places away from the lake's influence. This finds an excellent example in the Bayfield peninsula and the shore of Lakes Superior and Michigan in general.

The Bayfield peninsula is shown by the observations collected by the Weather Bureau to be as warm, and as free from frost as south central Wisconsin.

These four chief factors, soil radiation, air drainage, exposure to the sun, and to lake influence, and also many minor factors are at work in the United States to produce a mosaic of climates of infinite variety. Regarding the variety of soils and climates in the United States, and the possibility of adapting specialized and highly profitable crops to them Fairchild says in his Bulletin on *Systematic Plant Introduction*, page 22, "Nothing better illustrates the great variety of these conditions in America than the constant discoveries that are being made of restricted localities like the thermal belt of North Carolina or the Rocky Ford region of Colorado, which are specially suited to the cultivation of special crops. Europe, little larger than the United States with a climate tempered by the Gulf stream and an unusual extent of coast line, possesses an agriculture the extremely varied nature of which can only be appreciated after special and prolonged study. The local nature of its plant industries is often a matter of surprise, and is due in large part to the discovery of certain peculiarities of soil, or climate or the origination of some variety especially adapted to local conditions. Not more than 12000 acres in southern Spain have been found suited to the production of the best grades of sherry, and the annual output of this expensive wine is only 35,000 butts. Adjoining districts produce wine which, although sold as sherry, is of a quite inferior quality. The well known Rheingau region of the Rhine, producing some of the most famous varieties of wine, such as the Steinberger Zeltinger, Assmanshausen, and others, is extremely limited in extent, and depends in large part, according to recent investigations by Mr. W. T. Swingle, upon the presence in that region of a particular kind of clay shale. The same varieties of Riesling grape grown in France upon other soils fail to produce comparably excellent wines. The suitability of the region about Cannes and Grasse, France, to the growth of

roses and other perfume bearing plants has led to the building of extensive perfume factories there. The fruitless attempts to produce Vuelta Abaja tobacco or the Sumatra wrapper in regions other than those in which they have earned their celebrity all point to the presence of certain soil and climatic conditions to which the plant varieties are particularly susceptible, but which are not yet perfectly understood."

China, Japan, and lastly Europe have been driven by the pressure of an increasing population to develop systems of intensive agriculture that take advantage of every natural peculiarity. Their methods have been developed under pressure, by costly trial and error, by the survival of the fittest.

The tide is rising in this country. Today there are five mouths to feed where ten years ago there were four. The land available for agriculture is nearly all occupied. It is now a question of improving the methods of agriculture if our population is to be fed, clothed, and housed. It will be most economical to do this intelligently by applying known principles to the study of our farms, and the adaptation of plants and animals to them to the end that the greatest efficiency of production may be secured.

THE WORLD'S GREAT RIVERS,—THE DANUBE

By FREDERICK HOMBURG,
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THE rivers of Europe cannot compare in size or volume with the great streams of America, of Asia or of Africa; they have less space in which to develop. The larger European rivers are, in a certain sense, side tracked, in that they do not communicate at all, or only indirectly, with the Atlantic, and hence are remote from the great lines of trade. What the European river systems lack in magnitude is somewhat made up for by their number and diversity. The rivers flow in all directions from the heart of the continent or drain its eastern plain. The divides are, in many cases, of such character that canals may be and are constructed to connect the systems, and, as a rule, shipping is not obstructed by cataracts.

The main drainage channel of central Europe and the second river of the continent is the Danube. Of its tributaries, the Inn, the Theiss, the chief river of Hungary, and the Pruth, forming the boundary between Russia and Roumania near the mouth, deserve mention.

In the upper course the volume of its waters does not vary much, for like the Rhine and the Rhone it is fed by glaciers; but in the lower reaches it is low in early fall just at the time when the crops must be moved. Another disadvantage is the long ice blockade, a consequence of the continental climate; the "dead period" at Galatz, in the same latitude as Venice, often

lasts as long as 39 days. The consequent dullness is not the only loss; the breaking up and movement of the ice is the cause of much damage. But with all its drawbacks, the Danube is the great artery of commerce for all the lands which it reaches, especially since its improvement by the establishment of canal communication with German rivers, by regulation of the rapids, and by the construction of jetties at its mouth.

Where is there another river so international as the Danube? It rises in Baden and flows through Würtemberg and Bavaria; nearly half its length lies in Austria-Hungary; then it separates the latter country and Servia. At Orsova three nationalities meet,—Hungarians, Servians and Roumanians; after that it serves as a boundary between Roumania and Bulgaria; and its mouth lies in Roumanian territory. As one passes from source to mouth, strange sounds greet the ear: first High German dialects, as Alemanic, Suabian and Bavarian; then the language of the proud sons of Arpad, the Magyars; then the Servian and Roumanian and Bulgarian tongues. The management of the river improvement shows the number and variety of the interests. An international commission undertook the deepening of one of the delta channels, and a joint commission of the riparian states removed the dangers of the rapids.

The scenery along the Danube is as varied as the people that dwell on its banks. There are stretches whose beauty rivals that of the picturesque parts of the castled Rhine; then comes the monotony of the wide plain; then it breaks once more through mountain chains and again the scene is wild and beautiful.

A careful study of the course of the Danube shows how independent it is of the surface of the country. The trough between the Alps and the Carpathians causes the infant stream to head for the East; but it flows in a deep, narrow valley through part of the Bohemian highlands. There is a water-gap through the Alpine foot-hills above Vienna, another through the Little Carpathians at Pressburg, still another at Waitzen, cutting the central ridge of Hungary, and the most celebrated of all at the Iron Gate where it flows athwart the South Carpathians. The conclusion is forced upon us that it is an antecedent water course, i. e., the stream is older than the present topography. To maintain its early direction, it cut deeper and deeper into the rising ridges, and thus the gaps were formed. Between the gaps and beyond the Iron Gate where the current slackens, the river has its accompaniment of distributaries, lakes and swamps; but in many places the current is so strong that most of the transportation is down stream.

There is more of the beautiful blue Danube connected with Austria-Hungary than with any other state; and this river and its tributaries cement the heterogeneous parts of that composite country more naturally and more firmly than laws and treaties can. Far more freight is moved on the Danube than in and out of the Austrian Adriatic ports; so that in

spite of the possession of a strip of coast, the monarchy may be called an inland state. Unfortunately for this government, the all-important Danube slips from it by flowing far beyond the borders of the land, yet it has even in politics a directing influence. The eyes of Austrian statesmen are turned eastward. Economically and politically the Danube is of such dominating significance to Austria-Hungary, that it has been suggested that this conglomerate state be called not the Dual Monarchy but the Danubian Monarchy.

The Danube was the scene of Roman colonization, of the fierce inroads of the migration of the Huns, the Avars, and the Magyars, of the advance of the Crusaders to the East, of that of the Turks toward the west, and more recently of the growth of the House of Hapsburg and of the disintegration of the Ottoman realm. What causes this frequent reference in history to the Danube and its valley? A glance at the map will account for it: stretching from the head-waters of the Rhine, the Rhone, the Elbe and the Oder to the Black Sea, the Danube forms and for ages has formed the connecting link between the Orient and the Occident.

TRADE OF THE UNITED STATES WITH SOUTH AMERICA, 1911

TRADE between the United States and South America in the calendar year just ended was practically 300 million dollars in value, a total in excess of that of any earlier year. In 1900 the trade between the United States and that continent aggregated 144 million dollars; in 1905, 211 million; in 1910, 290 million; and in the first eleven months of 1911 for which details are available, 273 million, of which over 29 million represented the month of November, thus indicating for the complete calendar year a total of fully 300 million dollars.

Our imports from South America still exceed our exports to that continent, though the latter are rapidly gaining in the proportion which they form of the total trade. In 1900 imports were valued at 103 million, exports at 41 million, exports thus being 29 per cent of the total trade. In the 11 months of 1911 imports were 165 million and exports 109 million, the latter being 40 per cent of the total trade.

The imports into the United States from South America are chiefly drawn from the following countries, in the order named, the totals being estimates for the full calendar year based upon 11 months figures already compiled by the Bureau of Statistics, Department of Commerce and Labor. From Brazil the total is likely to be 100 million dollars, compared with 104 million last year; from Argentina, 28 million, compared with 32 million in 1910; from Chile, 19 million, against 20 million in the preceding year; from Colombia, 10 million, against 7¾ million in 1910; from Peru, 9 million, against 8½ million in 1910; and from Venezuela, 8½ million,

compared with 7¼ million dollars in the preceding year. From Ecuador the year's imports are a little over 3 million dollars, from British Guiana, a little less than 2 million and from Dutch Guiana about 1 million dollars. The Bureau of Statistics estimates the year's imports from South America at approximately 183 million dollars, or slightly less than the figures for 1910, which were 189 million.

Exports to South America, on the other hand, show a marked growth when compared with those of a year earlier. To Argentina, the largest South American market for American products, our exports increased from 42¾ million dollars in 1910 to 50 million in the year just ended; to Brazil, from 25 to 28 million dollars; to Chile, from 10 to 15 million.

Foodstuffs and manufacturers' raw materials are the principal classes of merchandise imported into the United States from South America, while manufactures make up the bulk of the exports from the United States to that continent. Of the 15 million dollars worth of nitrate of soda imported into the United States, practically all is from Chile. Brazilian coffee supplies a large proportion of this staple requirement of American breakfast tables, from a half to three-quarter billion pounds per annum coming from Brazil, compared with about 60 million pounds from Colombia, about 40 million pounds from Venezuela, about 12 million pounds from the East Indies, and about 1½ million pounds from other countries of Asia and Oceania. From Peru we import nearly 40 million pounds of copper pigs, ingots, etc., and from Chile about 15 million pounds of copper ore. About 25 per cent of our imported cocoa and cacao, crude, comes from Brazil and Ecuador. Even cotton is imported to some extent from Peru, about 4 million pounds in the year just ended and larger amounts in certain earlier years. Argentina, Colombia, Uruguay and Venezuela are important sources for imported cattle hides, while goat skins and sheep skins are imported from both Brazil and Argentina in considerable quantities. Between one-half and one-third of the imported India rubber is from Brazil. Our imported wool is largely drawn from South America. Of the 40 million pounds of clothing wool imported in 1911, over 13 million pounds were from Argentina, while the remainder was mostly from the United Kingdom, Australia and Tasmania.

The leading articles participating in the increased exports to South America are agricultural implements, cars, carriages, manufactures of iron and steel, illuminating oil, cotton goods, lumber, flour, medicines, and meats·

ANNUAL MEETING OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS

THE Washington meeting of the Association of American Geographers, held Dec. 28-30, was one of the best since the organization of the association eight years ago. Nearly forty papers of wide variety were presented. President Tarr's address on *The Glaciers and Glaciation of Alaska* was a splendid summary of the several seasons of work carried on by himself and Professor Martin. Prof. Davis was president of the Geological Society of America, and his duties at that meeting kept him away from the geographers much of the time. His presidential address on *The Relation of Gography to Geology* was given before the members of both societies. Professor Salisbury, president-elect of the Association of American Geographers, did not present a paper, nor did Professor Brigham. It has been a matter of regret to many of the younger men who attend the meetings, that the older men, men of travel, maturity and wide experience, do not regularly present before the association the results of some serious investigtions. We believe that not only does the permanent growth of the association require this, but also that the establishment of geography as a respected science in America requires it. If there is any body of men in this country, qualified to give geography scientific standing, those men are found in the Association of American Geographers. Its *Annals* ought to contain the results of the best scholarship in this country in the field of geography. Manifestly this can be true only if the strong men of the association regularly plan to carry on studies, and to present papers of the thoroughgoing kind which they are so well qualified to handle.

The social side of the meetings is delightful, the good fellowship is abounding, the regularity of attendance at the sessions, and the attitude of attention and interest when papers are being read are ideal, and the general level of the papers presented is high. There has been no lowering of standards since the organization began. There is a fine spirit of loyalty among its members. The association is in every way fitted to do splendid things for the branch of science which it champions. We wish the council could induce twenty-five of the most experienced and best qualified members to undertake lines of investigation during the coming year, much as candidates for degrees undertake thesis problems. We wish that the meetings of the association might now and then be held in conjunction with the Historical Association and the Economics Association, and that a half-day joint session might be held, in which session selected papers of an historical-geographical or an economic-geographical character should be presented. We of the Middle West also wish that the meetings might be held just a little more frequently in our territory. The JOURNAL wishes President Salisbury eminent success in making the 1912 meeting equal to the best in the association's history.

BOOK NOTICES

THE STORY OF COTTON AND THE DEVELOPMENT OF THE COTTON STATES:—By Eugene Brooks, pp. 370; Rand, McNally & Co., Chicago and New York, 1911.

Brook's Story of Cotton is a well written authoritative account of King Cotton. He gives a history of the use of cotton; describes southern life "before the war;" discusses the growth, manufactures and importance of cotton and is interesting to young and old. This is an excellent supplementary volume for the upper grades and should be a book of reference in all technical schools dealing with textiles. R. E. D.

HIGHROADS OF GEOGRAPHY, Volumes 1 and 2. Thomas Nelson and Sons, New York and London.

The first two volumes of a new series of supplementary books for children, entitled Highroads of Geography are devoted to Sunshine and Shower and Boy Scouting at Home. The first is a simple book for beginners dealing with the elements of human and physical geography, the second is a more advanced treatment of elementary geographic facts and relationships developed around the idea of giving children training in scouting before they are old enough to be scouts. The books are well organized, interestingly written and well illustrated. The second volume in particular is more than suggestive as to ways and subjects in dealing with beginners in observational geography. R. E. D.

PRODUCTIVE FARMING by Kary Cadmus Davis, Ph. D. J. B. Lippincott Company, Philadelphia. 7½x5, 345 pp.

A book intended to meet the needs of rural and village schools, chiefly below high-school rank. It deals with practical agriculture under the general headings of plant production, animal production, and animal products. The subject matter is well organized and clearly presented and aims to furnish a fund of very practical information. It is perhaps open, in part, to the adverse criticism of being too inclusive. The text is well supplemented with simple laboratory exercises, review questions, and lists of references. The chief innovations are in the form of an introductory chapter on the teaching of agriculture, and a brief but suggestive closing chapter on farm management. This book should prove a valuable addition to the group of elementary agricultural texts already in use. V. C. F.

The United States Bureau of Education published early in 1911, a Bulletin, numbered 446, entitled Bibliography of Science Teaching. This includes fifty-five annotated entries under geography and will be found a valuable reference source for all teachers of geography. The Bulletin may be secured on application to the Commissioner of Education, Washington, D. C.

Professors Olmstead, Charles and Wrench have recently published Part II of Volume I of their *Travels and Studies in the Nearer East.* The publication contains 45 figures and 27 plates showing the Hittite inscriptions discovered and, in part, deciphered by the members of the Cornell University Expedition to Asia Minor and the Assyro-Babylonian Orient some years ago. A large amount of new light is thrown upon the history of parts of the Nearer East by the work of the expedition. The publication is sold by Andrus and Church, Ithaca, N. Y. ($1.50).

A little folding relief model of the Panama Canal Zone has recently been published by James R. Gray & Co., 107 N. Market St., Chicago. It is about 9 by 14 inches, and shows with notable clearness the locks, dams, proposed fortifications, relief of the country and many other facts of interest. It sells for 25c.

MORE ON "A NEW FORM OF TEST"

LAST month we published, under the title "A New Form of Test," a device for testing pupils' knowledge by a less time-consuming method than that of the usual examination. This same device was recently used in testing a class of about 150 students of Physical Geography in the University of Wisconsin. The test required only ten minutes of the class' time and the work of correcting the 150 papers took less than an hour. The same class had recently taken a one-hour examination and two instructors had spent a total of nearly twenty hours in grading the papers: yet the average grade of the class in the two tests differed by only about one per cent.

This method of testing pupils has attracted some attention and the JOURNAL has been receiving letters regarding it. Prof. D. C. Ridgley has written suggesting that we reprint the set of test statements which we published in January, and offer them for sale, in the hope that the test will be given in various schools and that reports upon the usefulness of the device may be obtained and published. The Journal will send postpaid in quantities of 20 or more at the rate of 50 cents a hundred printed sheets containing 25 test statements on *the atmosphere and climate.* The list will include the 18 statements printed on page 176 of the January Journal of Geography and seven additional statements. A slight revision of the list published in January will be made in the interests of greater clearness of statement.

The Journal invites geography teachers to try out this device and to report upon the results.

It ought to be understood that this method of testing classes is to be used only in connection with other methods. It has advantages and it has disadvantages. The great saving of time is its chief recommendation.

The statements which are used must be carefully prepared and ought to be criticised by a second person. Furthermore, the device does not lend itself equally well to all phases of geography. It works best in those parts of the science where *exact* knowledge is desirable, such, for example, as mathematical geography, climate and winds. The following set of statements, designed as a test for elementary classes studying the geography of the United States, illustrates this point. The writer does not consider the following set of test statements to be very satisfactory. He found it difficult to select and phrase suitable statements in such a broad field as that presented by the general geography of the United States.

Some of the following sentences state facts and some do not. The pupil is to select and check the untrue statements. The exercise will be more valuable if the pupil also tells why the statements are untrue.

1. The position of the Mississippi River, about midway between the Atlantic and Pacific coasts, makes it a convenient dividing line between East and West in the United States.

2. The valley of the Red River of the North is one of our greatest wheat producing regions.

3. The vast amount of iron ore mined in Pennsylvania gives Pittsburg an important advantage as an iron and steel making city.

4. The more northerly latitude of Minneapolis as compared with London accounts for the colder climate of the former.

5. The fact that no coal is found in New England is a drawback to manufacturing there.

6. The situation of southern Florida and southern California in the torrid zone partially explains the large quantity of fruit produced there.

7. The Rocky Mountains are about as far from the Pacific as Chicago is from the Atlantic.

8. The position of Philadelphia at the head of Chesapeake Bay is favorable to commerce.

9. The United States has a larger trade with the United Kingdom than with any other foreign country.

10. Nearly all of the anthracite, or hard, coal mined in the U. S. comes from eastern Pennsylvania.

11. More than one-third of the land of the U. S. is not cultivated because it receives too little rainfall to support farm crops.

12. The extremely cold winters of Montana are largely due to the chilling winds from the Pacific.

THE ATMOSPHERE—20 "WHYS?"

1. Why is oxygen called the vital element of the atmosphere?
2. Why would an atmosphere containing 3-4 or 4-5 oxygen be unsuited to animal life such as now exists?
3. Why is nitrogen, though very inert, such an important part of the air?
4. Why is warm air lighter than cool air?
5. Why is the atmosphere more dense at sea level than on high mountains?
6. Why does the mercury in a barometer stand higher at the foot of a mountain than at the top?
7. Why and how may a barometer be used to measure the height of a mountain?
8. Why do clouds form in the atmosphere?
9. Why does moisture sometimes gather on a pitcher of ice water on summer days?
10. Why does it not gather on a pitcher of warm water?
11. Why do we not expect rain from a clear sky?
12. Why does dew collect on vegetation during clear summer nights?
13. Why does dew, as a rule, not collect on cloudy or windy nights?
14. Why do the phenomena of dawn and twilight occur?
15. Why do movements of the atmosphere (winds) occur?
16. Why are the tops of lofty mountains cold?
17. Why are the highest clouds, the cirrus,, composed of ice spicules?
18. Why are the nights so chilly in deserts?
19. Why do we not fear frosts on a cloudy night in late spring or early fall?
20. Why are the coldest nights of winter always clear nights?

QUESTIONS ON THE ATMOSPHERE

1. Composition of the atmosphere? depth? pressure at sea level?
2. Results of the presence of oxygen in the air; of nitrogen? of carbon dioxide? of water vapor? of dust?
3. Show how the depth and character of the atmosphere affects the general climate of the earth.
4. How does the amount of water vapor in the air affect its weight?
5. A column of air of one square inch cross section reaching to the top of the atmosphere weighs how much? How high is a column of water of the same cross section and equal weight? of mercury?
6. Whence comes the water vapor of the atmosphere?
7. What determines the amount of vapor in the air at any given time?

8. Why does vapor rise in air? Why does it condense? when?

9. What is radiant energy? radiation? conduction? convection?

10. What is meant by transparent? by diathermous?

11. Why do clouds shut out much radiant energy?

12. When do bodies emit radiant energy? When do they absorb it? Do all bodies reflect it? Explain.

13. Why does the ground grow steadily warmer in summer? Is it so in the southern hemisphere?

14. Why does it grow steadily colder in December? Is the sun going farther from the earth?

15. Why do some objects cool more quickly than others? Why is a city street between high buildings so hot on a summer day?

16. Explain exactly how the atmosphere is warmed. Why does warm air rise?

17. Why is a desert subject to extreme changes of temperature from day to night?

18. Why does a lake heat more slowly than the adjacent land? How does the sea or a large lake modify the climate of the neighboring land?

19. Give three reasons why the temperature rises toward midday.

20. Meaning of absolute humidity? relative humidity? precipitation?

21. What is dew? Why produced? Why is little produced on a cloudy night? on a windy night? Why more dew on grass than on a board walk? Does the dew fall?

22. Explain the formation of frost; of fog; of clouds. What are cumulus clouds? cirrus clouds?

RICE FEEDS HALF THE HUMAN RACE

In the current issue of *Farm and Fireside* there is an interesting article setting forth the importance of rice and the possibility of its development in this country. Following is an interesting extract:

"The value of rice as an edible product can scarcely receive more striking confirmation than is given by its extensive use. It is almost the only food of from one-third to one-half of the whole human race. The population of China is 404,000,000 and rice forms the principal food of its people. India has 273,000,000 people, and the same statement may be made with reference to their use of rice. Japan has a population of 39,000,000, and rice forms 51 per cent. of their total sustenance. The population of the remaining rice-consuming countries of Asia and Africa may be roughly estimated at 80,000,000. Thus it appears that not less than 796,000,000 human beings, or 54.2 per cent. of the total population of the earth, have rice for their principal food. This fact alone stamps it as the earth's most important cereal.